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Educational Materials Yesterday, Today, and Tomorrow

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Today, I would like to review with you the problem of educational materials for our field. I want to reflect, briefly and in a global way upon the past; to dwell in some detail upon the present, and to attempt, briefly, to peek into the future.

When we review the history of providing materials for the education of visually impaired children, one fact stands out. This is the continuing burden placed on the classroom teacher to provide materials for child use. In the written history of our field, these heroic efforts are largely unrecorded. Better records do exist, however, of formal efforts to provide teachers first with texts and other books, then with student tools, and finally with special subject material designed to meet the developmental needs of the visually impaired. It is these formal efforts to provide materials I want to consider. Consequently, most of my remarks will reflect the history of the American Printing House.

A good picture of early formal efforts to provide educational materials can be gleaned from the reports of the meetings of this association. Review of these reports indicates that until 1920, formal efforts to provide educational materials were concentrated almost exclusively on provision of tactile books. During this period progress was severely impaired by lack of standardization of the tactile codes in which books were printed. Initially, individual schools attempted to produce their own books. For example, Perkins had a press as early as 1835. However, schools producing and exchanging books was an inefficient process and the need for more centralized efforts became apparent. Several states cooperated to establish the American Printing House

for the Blind in 1858.

This project really did not get underway until 1866 with publication of its first book. By the early 1870's the Printing House was a going concern and its future as a permanent source of material was guaranteed through passage in 1879 of the Act "To Promote the Education of the Blind." This law provided federal funds for costs of labor and materials to manufacture books and apparatus needed in education of the blind. Perkins continued to be a source of books during this time and in 1879 the Howe Press came into being. Other groups, such as the National Association for Publishing Literary and Musical books for the Blind existed as formal sources of educational materials.

As indicated earlier, emphasis during this early period was on publication of tactile books. As late as 1880, the APH catalogue mentioned only braille slates, cursive writing guides, and maps as additional materials. Howe Press brought out a braille writer in 1900 and supplied slates and a small number of other tools. Even by 1920, the only additions in the APH catalogue were spelling frames, parquetry boards, sewing cards, and peg-boards.

At an informal conference of the trustees of the American Printing House held at the Vinton, Iowa meeting of the Association of Workers for the Blind in 1921, it was agreed that when funds became available, the Printing House should become a distributor of apparatus. Needs for writing tablets and braille writers were expressed as well as the need for thorough testing of the apparatus to be produced. However, at the subsequent meeting of trustees of APH in Louisville the following month, it was determined that because of lack of manufacturing space, these devices could not be produced at that time. Little progress was made toward production of apparatus in the twenties. The

1930 catalogue of APH listed script writing materials, spelling frames, slates & styli, and maps. Tests and measures made their appearance during the twenties.

In 1930, a change in administration occurred at the Printing House and with it came renewed interest in production of tangible apparatus. During this decade a braillewriter, arithmetic type slates, the Beetz Notation graph, and talking books were added to the list of APH products.

The decade starting with 1940 was replete with problems arising from materials and manpower shortages. However, during this time, an additional arithmetic type-slate and the New Hall Braillewriter were made available. This decade was critical in one respect. APH started publication of large type textbooks.

For the American Printing House, the present, in terms of expanded production of educational materials, really began in the 1950's following another change in administration. Using its own funds, APH initiated research. In 1951, the Educational Research Committee was formed from among the ex officio trustees of APH and the Department of Educational Research was established. In 1954, the Tangible Apparatus Committee was formed to oversee the development and manufacture of these materials. By the end of the fifties, APH produced about 50 different educational aids as well as books in braille, large type, and recorded form. Included among the aids was a wide range of writing tools and materials, several arithmetic materials, a wide variety of maps and globes, and aids for music.

To my mind, the present was brought to full flower after 1960 through a variety of federal legislated programs that supported educational research and development. Administered by the Department of Health, Education and Welfare through such agencies as the National Institutes of Health, the

Rehabilitation Services Administration, and the U. S. Office of Education, these programs provided funds for both study of the behavioral capabilities of the visually impaired and the translation of these findings in the development of educational techniques and materials for their use. A milestone in these programs was the creation of the Bureau for Education of the Handicapped as part of the Office of Education in the early sixties.

The impact of these federal programs on special education generally has been tremendous. From 1960 to the present, they have augmented APH resources to bring into being a mature program of educational research and development. In this program, extensive research on tactual perception, tactual reading, and learning through listening has been conducted. Most of these studies have yielded results that can be applied to improve design of educational materials.

Since 1966, the Bureau for Education of the Handicapped of the U. S. Office of Education has supported broad educational materials development efforts at APH. Along with efforts supported by APH funds, these have resulted in a six-fold increase in the number of aids available from APH, increasing from about 50 in 1950 to 290 in 1976. Federal funds have resulted in educational products for mathematics, science, social studies, braille reading, low vision training, sensori-motor readiness, language development, educational measurement, plus games and other materials. APH supported research has developed processes for computer translation of literary braille and music and for producing flexible discs and short-run large type. APH funds have supported development of major tools to include the Lavender Braillewriter, the 4-track cassette players, and the Variable Speech Control.

A natural result of intensified research and development activity is that we have been able to bring our materials development procedures to a

high level of maturity. This growth, of course, is not restricted to the field of the visually impaired. This maturity is reflected in how we define our needs and set priorities, how we carry out the formative stages of development, and in the ultimate evaluation of materials in the field.

In determining needs and setting priorities we have come to work very closely with our consumers. At the highest level, this interaction occurs through our Educational Research Committee and Educational Aids Committee composed of administrators at the state level. Every curricular area in which we do materials development is represented by a group of teachers and teacher trainers who help set priorities. At the present, we are cooperating with the Bureau for Education of the Handicapped in a nationwide survey of educational materials needs for handicapped children. It is hoped this survey will reach 130,000 teachers of handicapped children. We have helped Educational Testing Service, the prime contractor, to identify relevant areas for questioning, to design the questionnaires, and next year we will write the report for the visually handicapped. Many of you at this meeting will receive these questionnaires in the fall. Let me urge your serious cooperation in this study because its results will be used by APH and others to identify the materials to be developed for the next several years.

Procedures for development of materials have become well defined and integrated. Once needs are identified and priorities assigned, specific materials development projects can be undertaken. In these projects the procedure most often followed is that materials objectives are defined, specifications for materials that meet these objectives are written, first designs of materials are made, these are reviewed by experts, materials are revised, then they are pilot tested with students, and revised again.

These cycles are followed until the project staff is satisfied that the materials are ready for field evaluation. During this sequence, consumers are participants. Almost every project has a group of teachers, chosen nationwide, who take part in initial materials development and review. The team we have formed for development of a primary braille reading series is an example. It consists of persons with the following backgrounds: One person with long experience in writing primary reading materials, one person with nationally recognized experience in reading research, three persons with long experience in teaching braille reading and in teaching others to teach, one person with long teaching experience and administration experience at the state level, and two classroom teachers of braille reading.

Every product that the Printing House develops is subject to some kind of field test. Unfortunately, the small numbers of children who are visually impaired and their wide scatter seriously limit our ability to make strictly experimental comparisons of materials use outcomes. It is possible to empirically evaluate the legibility and manipulability of the materials we make. Evaluation of materials by teachers while actually using them with children is a procedure that has proved fruitful.

The maturity of our thinking is reflected in the fact that we are no longer content to restrict ourselves to the publishing of books, design of tools, or tactile analogues of sighted materials. We are designing specific instructional sequences for the visually impaired. Experience has taught us the futility of designing broad curricula in any area for the visually impaired. Their wide scatter through many school programs makes the probability of wide adoption of any single curriculum slight. However, we can design small specific instructional packages that can be integrated into any curriculum.

Other groups are using federal funds to develop sophisticated educational materials packages for the visually impaired. This year APH produced a recorded typing program for the blind and career information and training activities which were developed elsewhere. Applications of technology sponsored through federal programs have resulted in development of sophisticated tools such as the Optacon. Today, a number of special versions of electronic calculators are available that display results of calculations in braille, spoken, or large type formats. Many of these devices are available on a commercial basis.

Educational materials are of no use if consumers are unaware of their existence. Present times are characterized by strong state and national efforts to provide information to teachers about available materials. A pioneering effort of this kind was the establishment of the Central Catalogue of Volunteer Produced Textbooks at APH in the early sixties. The Central Catalogue, which presently contains about 80,000 titles, provides educators nationwide access to the single copies of books produced by volunteers in braille, large type and recorded form.

In the mid-sixties, the Bureau for Education of the Handicapped set up an Instructional Materials Center Network. A major purpose of this Network of primarily state and regional centers was to supply information about materials available to teach handicapped children. This network was a major stimulus for setting up the approximately 15 state instructional materials centers for the visually impaired that exist today. One national Instructional Materials Reference Center for materials information for the visually impaired was set up at the Printing House. This national center supplied information about volunteer produced, APH produced, and commercially produced materials and also loaned demonstration sets of materials.

In 1974, the Instructional Materials Center Network was replaced by a new materials network composed the National Center for Instructional Media and Materials for the Handicapped, 13 Area Learning Resource Centers, and four Special Offices. This network has several major functions: To develop instructional materials, to develop means to train teachers to use media and materials, to provide information on available materials, to distribute materials for examination purposes and training, and to aid states in setting up their own media centers and media use training programs.

Of particular interest to this group are two aspects of this system, the Special Office for the Visually Impaired and the National Instructional Materials Information Services or NIMIS. The Special Office is located at the American Printing House and NIMIS is located at the National Center for Educational Media and Materials for the Handicapped at Ohio State University.

The Special Office for the Visually Impaired has two primary functions. One of these is to identify materials which are available for education of the visually impaired and to write abstracts describing these materials for inclusion in the NIMIS system. The other is to adapt available materials or develop new materials where these are needed for education of our children. This is one of the broad research and development supports for APH mentioned earlier. What is more important from the informational standpoint is the materials identification and abstracting.

The Special Office for the Visually Impaired is presently organized to monitor the catalogues of the majority of producers of child use materials in this country. Catalogues of producers of materials for the visually impaired in other countries are also monitored. Materials are evaluated using standard criteria. Those materials meeting these criteria are described in abstract form using standard procedures. Information included in the abstract

includes bibliographic data, evaluation results, a short narrative description of the material, and a set of terms describing the materials derived from the NIMIS Thesaurus. It is these latter terms that permit the recall of the abstract from the memory of the computer. To date we have written abstracts for about 7,000 educational materials. Four thousand of these abstracts describe commercially available materials.

The forms are sent to NIMIS where they are entered into the computerized information system along with abstracts of materials for other handicaps written by two additional Special Offices. These abstracts can then be recalled by entering the appropriate descriptors from the NIMIS Thesaurus. Not only will NIMIS offer direct access to educational materials information through computer terminals, but it will also publish a variety of materials information references.

An interesting innovation has been made in the new materials network. If a teacher uses NIMIS and identifies potential materials from reading the abstracts, she may not yet be sure the material is what she really needs. In many such cases, the teacher will be able to borrow the material for review and trial use from a fourth Special Office located at Indiana University in Bloomington.

NIMIS should be operational with the start of the school year in 1976. All of us should become familiar with procedures for its use and make maximum application of this tremendous new resource.

And now a few thoughts for the future. The future certainly is not clear. In this bicentennial year, when we look at the many problems that confront us in special education, we can't help but wonder where we will ever get the resources to attack them. The implementation of Public Law 94-142 is going to provide much help. Educational programming for individual

children is going to create a greater demand for especially designed materials. Mainstreaming is going to increase the scatter of our children. This should increase the total demand for educational aids and magnify the demand for very small numbers of specific text titles. Certainly this scatter is going to make our research and development task more difficult.

During the next decade, I think we will continue to see the development of instructional packages based on the special needs of the visually handicapped. Under development at the Printing House are such diverse materials as a primary braille reading series complete with work materials and teacher manuals, a set of materials to provide basic sensory experiences to multi-handicapped children, and materials and tools to teach metrics. Outside the APH, materials under development include sets of individualized science experiments for elementary students, sets of materials for cognitive remediation, and orientation and mobility materials. There will be adequate coordination between APH and outside developers to maximize potential dissemination for newly developed materials.

It is through application of technology that the most striking advances will come. With respect to provision of braille, I expect that short-run production by braille presses will become economically feasible. Other means of storing and displaying braille reading materials may appear as is possible with the magnetic tape operated Argonne Braille Reading Machine. Application of optical character recognition can revolutionize braille printing and perhaps reduce costs. In any event, I think our old friend braille will maintain its important role in education of the blind.

Direct access to print will become a growing possibility through application of optical character recognition. Expressing print in spoken form as is projected for the Kurzweil Reading Machine will enable visually

handicapped readers to attain reading speeds up to 300-400 words per minute.

Remote access to printed material is probable. A braille reader will be able to contact a library, arrange for a book to be optically sensed, reproduced in synthesized speech, and read to him over a phone or other communications system. In a like manner, a large type reader could have his material displayed on a TV screen or use the same spoken output.

Development of a variety of tools which will enable the severely handicapped to maintain more direct contact with their environment is probable.

In conclusion, the picture reveals that after a one hundred year pre-occupation with tactile books, the field responded to the needs for a variety of educational aids and tools. Means and methods were found for the development of these in growing numbers. This growth shall continue into the future. In the future we can look to a significant impact from application of technology to access to the printed word. However, braille will still be with us.

